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ABSTRACT

The basis of perception is found in the sensory experiences of an individual. Cognition, in turn, may be thought of as organized perceptions. Hence, diagnosis of learning disabilities should start with an assessment of the sensory skills in order to gain insight into the probable perceptual and cognitive problems involved in learning. The taxonomy presented in this paper illustrates the relationship of the sensory skills to both perception and cognition and shows the various facets of the sensory skills in relation to each other and to the perceptual-cognitive process. Further, the taxonomy could be useful in providing a base for a diagnostic testing procedure in schools or clinics. A skeleton outline of a protocol for the administration of various sensory tests and a representative list of tests which may aid in the diagnosis of the various visual abilities are provided. A list of references concludes the paper. (TO)

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Motor, Auditory, and Visual Development - A Taxonomy for Diagnosis and Training

by

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The basis of perception is found in the sensory experiences of an individual. Perceptions might be defined as organized sensory experiences. When sensory experiences are faulty, deficient, or underdeveloped, perceptions will be affected. Cognition, in turn, may be thought of as organized perceptions. When perceptions are inadequate, cognition will also be adversely affected. Subsequently, diagnosis of learning disabilities should start with an assessment of the sensory skills in order to gain insight into probable perceptual and cognitive problems involved in learning. Sensory skills that influence language perception would most seriously effect learning since language or its symbolic form is the primary tool used in the cognitive processes of speaking, writing, and reading.

Teachers and school clinicians are often bewildered by the theories and terminology that form the basis of the perceptual-cognitive process. The taxonomy in Figure I attempts to illustrate the relationship of the sensory skills to perception and cognition. It was conceived to aid pre-service teachers, classroom teachers and school clinicians in a reading and/or learning disorder clinic to see the various facets of the sensory skills in relation to each other and to the perceptual-cognitive process.

Further, the taxonomy could be useful in providing a base for a testing procedure in schools or clinics that conduct an educational diagnosis of children. Figure II gives a skeleton outline of a protocol for administration of various sensory tests. An educational clinic could select or adopt this taxonomy and formulate a testing protocol according to its own inclinations and experience. To

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this extent, the testing protocol does not prescribe a particular battery of tests. It is also not so rigidly conceived that it would set a pattern for medical diagnosis in the area of learning disorders, but it may well form the basis upon which an educator might intelligently refer a child for specialized medical service.

In explaining the taxonomy and the interrelationship of the sensory skills, one must be careful to note that the interrelationships are not so dependent upon one another that a deficiency or underdevelopment in one sensory skill disrupts the whole perceptual-cognitive process. For example, if a child had something less than a gross deficiency in visual efficiency, but had generally good sensory equipment, health, intelligence and environment, it is likely that learning to read will take place through a compensatory maneuver. If a child lacks in auditory discrimination, but has the other sensory equipment intact, it is likely that this factor would be circumvented and the other sensory skills would be relied upon, particularly visual skill in the case of learning to read. A single causation theory for learning disorder explains the source of the problem only when one of the major sensory skills is seriously deficient or impaired in an individual. Research generally shows a multiple causation pattern for a reading-learning disorder. Factors outside of the sensory skill domain, such as personality problems or environmental influences, may also be present in a multiple causation pattern. Multiple causations render difficult both the diagnosis and training of learning disorders.

The fact that deficiency in one sensory area could be compensated for by skill or strength in other sensory areas may explain why a child may still learn to read despite poor performance on motor, spatial orientation, and visual-motor association tests. There is not so strong a tie between reading and a particular motor

sensory skill that we can trace back a reading problem to some minor motor or spatial orientation difficulty. Good visual and auditory mechanisms could compensate for motor and spatial orientation problems if these problems were not relatively gross. Motor and spatial relation tests are important diagnostic instruments, but in themselves they are not so related to the act of reading that they positively diagnose and prognose reading problems. A child's visual and auditory skills may be so intact that words are remembered when seen and heard despite seemingly poor motor or orientation control.

Motor and spatial skills, nevertheless, should be diagnosed as a possible source of difficulty in various learning problems. Good motor equipment is supportive and works in relation to other sensory skills. When a child has no motor and spatial orientation difficulties, the child is free to concentrate on the visual forms of letters and words, rather than on holding the pencil or going in the correct direction in writing letters. Motor and spatial orientation training would be important to a child who lacks these skills in order to free him to learn with his other senses. Although sensory skills may compensate for one another, there is an advantage when they do not need to and can work together in the perceptive-cognitive act.

Except in the case of gross disorder, the area of dominance also illustrates the probable interdependence of the sensory skills and their compensating feature. Depending upon whether a normal population or an atypical group of children were sampled in research studies (Hildreth's summaries 1949, Burt 1937, Maki 1963), the studies indicate between 23 and 59 percent of the population are mixed dominant. An informal tally of undergraduate college students registered in the authors college classes over the past decade indicates that approximately 25 percent of these students are mixed dominant. Many mixed dominante individuals learn how to

read and some studies (Coleman and Deutsch 1964, Balow and Balow 1964) showed no or slight relationship between dominance and reading. The Maki study (Maki 1963) demonstrated that mixed dominance did not significantly interfere with quality of handwriting, although it did have an effect on speed of handwriting. When basic sensory mechanisms are intact, mixed dominant individuals probably learn how to perceive the world adequately despite their slight handicap. It seems plausible to assume that lack of lateral dominance does not significantly interfere with learning unless it is accompanied by other handicapping factors or unless dominance confusion exists. It may be postulated that mixed dominant individuals learn how to organize or internalize sensations needed in various perceptual activities and do not have dominance confusion.

It is the individual with confusion in dominance who is likely to encounter learning difficulties. An individual with confused dominance would likely have directional problems that interfere with visual discrimination of letters and numbers, poor visual integration between hand and eye activities, and weak visual memory ability due to confusion of the directional form of letters and words. Confused dominance may also lead to confusion in the auditory domain because it would be difficult for an individual to ascertain the directionality of sounds in space or the sequence of sounds in time. This would interfere with auditory discrimination, integration, and memory. Research studies need to be conducted concerning the matter of auditory dominance and its effect on learning. This neglected area of research may prove fruitful in understanding children who appear to be lost in the spatial world.

Figuratively speaking, the mind may be considered to be a wet computer that has two features. It is compensatory in nature and it operates with minimum cues at peak efficiency. Although the compensatory feature of the mind has already

been discussed, a further illustration to demonstrate this feature might be made by comparing it to a man-made dry computer. A number of years ago the Bell Telephone System installed the E.S.S. Electronic Switching System in Morris, Illinois, on an experimental basis. This system allowed a customer to automatically have calls transferred to another number where he would be available, to make speed calls to frequently used numbers, and to have three-way calls placed in order to create a multiple party connection. When the system was dismantled, minor flaws were discovered in the electrical connections, but the system was so self-regulated that it had corrected itself. It appears that the human wet computer with its intricate nervous system is likewise able to compensate for minor flaws or inadequacies in its system.

The mind, as a wet computer, also appears to operate on a minimum number of cues once a perception is learned. In learning to recognize the word "birthday", the child may need to discriminate visually between letters, to blend the sound of the letters into words, to remember the letter and sound order, and to remember the word configuration. After sufficient experience, the only cue the child needs to recognize or perceive the word "birthday" is the general and even partial word configuration. Phonetic cues are extremely important in the initial recognition and learning of words, but once a word is learned, the phonetic connection need no longer be made and general visual memory can be depended upon for recognition. Phonics invokes the use of a maximum number of cues rather than a minimum number of cues in the word recognition process. Individuals tend to drop their reliance upon phonics as they mature in reading skills since it involves maximum cue involvement. Phonics is important in the beginning initial act of reading for word recognition, but may actually interfere with comprehension in the mature reader because too much attention, time, and energy would be spent on using maximum cues.

When a child is consciously using motor skills in the act of reading or writing, a maximum number of cues is involved. The process of writing and sounding words would indeed be laborious if a child would have to think about how to form straight lines and circles during the handwriting activity and think about the motor production of speech sounds when sounding out words. Herein lies the value of motor and spatial orientation training for children. Motor skills need to be learned to the unconscious level so that they are internalized during the reading-thinking act.

Sensory motor skills are not needed to their maximum once they become internalized and are implanted in the memory bank. A child may seem to have poor motor coordination on visual-motor perception tests, have poor handwriting, or have mixed dominance and yet learn how to read. Such a child must have learned somehow to internalize the muscular movements that are involved in writing letters of the alphabet or to make the appropriate eye movements required in reading. Motor diagnosis and training is important, but it should not make us myopic and obsessive about undue efforts in motor training if no gross motor deficiency is evident and learning is taking place. Poor motor behavior in itself cannot be used to classify a child as one with a learning disorder. Problems in the auditory and visual realm may need to receive more attention for the reasons that these senses are more often directly related to the symbolic language activities encountered in the school learning environment.

An individual, no doubt, inherits a certain brain organization, as he inherits other body physical features. No amount of education can transcend a person's basic inherited equipment. Physical injury and illness may also impair the brain's neurological organization, and educational therapy should not be expected to compensate for a faulty neurological system. Although we are not able to cure all

problems by education, the task of an educational diagnosis is to aid in determining what sensory and sensory-related difficulties may be involved in learning disorder and to make specific recommendations for possible remediation.

In the educational realm, a case study should make specific recommendations and techniques on the data obtained from diagnosis. Teachers and school officials are often frustrated when presented with a grouping of data by a clinician without recommendations. Even worse, a clinician or school psychologist may refuse to divulge data because it would violate the confidence of the individual. This situation is unfortunate and often represents lack of ability or experience on the part of the diagnostician or little trust for professional colleagues. When specific recommendations are made, there is of course the danger that the material or technique is inappropriate, but this chance needs to be taken. Even when the material or technique is not completely appropriate for a child, results are often gained because of sympathetic individual guidance; some degree of success encourages the child; and the material prescribed is likely to be within the proper ability level. Should the recommendation prove faulty after a reasonable trial, then changes can be made. In fact, good remedial teaching means continual diagnosis and adaptation of materials.

Four major approaches are generally advocated in working with a reading and/

or learning disabled child. The first approach is to teach to the specific weaknesses of a child; the second approach is to teach to the strengths of a child; the third approach is first to strengthen and develop the neurological organization and/or motor aspects involved in the learning process; and the fourth approach is to use an intersensory technique which attempts to inject all the senses into the learning process. It is quite likely all of the approaches have their place in the remedial situation when matched with the appropriate pattern of diagnostic data. The teaching to a weakness approach might be valid with a child who had an underdevelopment in one sensory area due to lack of opportunity to learn. Such a child could adequately learn through a given sensory area when the weakness was corrected. A child who has high intelligence and is capable of language comprehension and interpretation might also profit from training in the area of weakness and gradually see insights because of good general intellectual ability. The teaching to a strengths approach might be most worthwhile for a child with lower intellectual ability who needs to capitalize on strengths or with a child who has psychological problems and needs to experience success in order to develop ego strength. The neurological organization and/or motor approach might be most suited to a child who has confused dominance, directionality problems, poor motor coordination, eye-hand confusions, and spatial orientation difficulties of a rather severe nature. In this case, basic skill must first be developed in the motor system before a child can profit from instruction and make visual and auditory motor associations. The intersensory approach might be used as the follow-up training procedure for children who have received motor training and are now free to learn through the other sense organs. It may also be sought after traditional learning procedures or other approaches have failed to produce results.

Diagnosis in the sensory skills should be hierarchical and comprehensive in

nature. A clinical diagnostic examination that only included visual efficiency and discrimination would not be comprehensive enough in diameter to evaluate all the visual skills involved in the learning process. The taxonomy and clinical testing protocol presented in Figures I and II are designed to provide this hierarchical and comprehensive base for diagnosis. Tests and parts of tests are chosen by a clinician to complete a thorough analysis of a child. It is the pattern that grows out of such a diagnosis that forms the conclusions for remediation. More valid conclusions can be made when a pattern of behavior is shown than when a single-symptom bandwagon is used to justify a remedial procedure.

Tactile - Kinesthetic Diagnosis and Development

In the tactile-kinesthetic area of diagnosis, a neurological evaluation of a child should be made. This realm has been largely left to pediatricians and neurologists in the past, but it would be well for schools to include a motor skills test in their readiness battery and it would be essential for an evaluation in an educational clinic. To be useful in a school setting, the test must be easily administered and scored to enable a relatively inexperienced examiner to judge if motor norms for a given age have been attained. If developmental norms have not been attained, a more comprehensive examination should be made by a specialist. Such tests, however, have not been adequately promoted for school diagnostic purposes. The Devereux Image Profile is an example of a test that evaluates aspects of a child's general motor skills. The Devereux Test is designed to give a teacher or a school clinician a normative base for assessing the motor functioning of a child. When neurological immaturity or disfunction is discovered early in a child's school career, corrective measures are more likely to be effective since emotional problems may not have materialized and the propitious

time for training basic motor skills has not passed.

Tests such as the Beery-Buktenica Developmental Test of Visual-Motor Integration, the Winterhaven Perceptual Forms Test, the Frostig Developmental Test of Visual Perception, the Bender Motor Gestalt Test, the Harris Test of Lateral Dominance, and subtests of the Illinois Test of Psycholinguistic Ability are designed to test special motor skills such as hand-eye coordination, spatial orientation, coordination of hands, coordination of hands and feet, and directionality. The Developmental Examination, as devised at the Gesell Institute of Child Development is described in the book, School Readiness, by Ilg and Ames, and gives a rather comprehensive normative evaluation of a child's behavior in all the sensory areas with a particular emphasis on the special motor areas of development. The acquisition of special motor skills are important in learning and retaining symbolic language since they are supportive to the visual and auditory systems. Figure III provides a list of tests and materials appropriate for diagnosis and training of general and special motor skills.

The speech motor skills of articulation and oral language facility are generally diagnosed in the classroom or clinic by the informal means of listening to a child speak and by observations made during an oral reading presentation. A more precise diagnosis could be made in an educational clinic through administration of the Illinois Test of Psycholinguistic Ability to determine a child's ability to respond vocally to questions, to respond vocally without conscious effort in completing sentence ending, and to respond vocally without conscious effort in repeating numbers in sequence. Oral language facility is the skill upon which the development of the symbolic language skills of reading and writing are dependent. Many research studies demonstrate that anomalies in speech or slow development in speech generally lead to difficulty in other language skills.

Language development must precede remediation in the reading and writing when deficiencies are found.

Auditory Diagnosis and Development

The auditory skills involved in learning are also often inadequately developed in school because they are often assumed to be acquired naturally. This assumption may not be entirely incorrect for the average child who receives adequate attention in the home. For a neglected child or for one whose auditory equipment is inadequate or faulty, lack of attention in training or in corrective measures may lead to serious learning problems as aural and oral language are the bases for symbolic language development. The neglected child is most likely to be correctable by direct teaching because he has the neurological equipment to profit from instruction.

Auditory ability is the prime mode of learning involved in teaching phonic skills. In beginning or remedial reading instruction, a teacher or clinician is wasting valuable time and effort in teaching phonics if the training is not grounded in auditory discrimination and integration skills. Learning phonetic principles through the visual means of phonic workbooks is largely for naught unless the child is aware of the auditory sounds of the letters. Phonics is an auditory, not a visual skill. The ear is the secret to success in applying phonetic knowledge in independent word identification and direct instruction in auditory training by the teacher is more important than the visual practice work encountered on printed worksheets.

Screening for auditory efficiency is quite a simple process on which to make referrals to an otologist. Most readiness and reading tests involve some type of auditory discrimination test and reading textbooks are replete with exercises to

develop discrimination. Auditory integration and auditory memory skills are more likely to be overlooked in diagnosis and training, yet these skills become most important in learning once the auditory mechanism is known to function adequately. Higher level auditory skills involve the ability to blend or integrate sounds into words, hear the sounds within words, focus attention on the appropriate sound, and remember the association of a sound with its graphic symbol. A list of devices to evaluate the higher level auditory skills is outlined in Figure III.

Visual Diagnosis and Development

Visual skills are probably the most highly or directly related sensory skills used in reading printed symbols. The one exception is when phonetic knowledge is applied to unlocking symbols. Dr. G. N. Getman, O.D. (Getman 1962) has outlined the visual mastery necessary for cultural success. These visual skills include possessing adequate control of speed and direction of eye movements; using hand-eye coordination involved in writing symbols and in the directionality demands of reading; noting the visual differences in words necessary for cue reduction involved in efficient, rapid reading; and having the visualization ability needed to remember printed symbols. Eye movements are important in pursuing lines of print in the correct direction with the appropriate speed and in making a return sweep at the end of a line. Good hand-eye coordination allows the eye to steer the body motor system in making straight lines, circles, and diagonal lines. The eyes, as the body's steering system, tell the motor system which direction to take in reading and writing. Cue reduction is accomplished when letter and word size, shape, length, and meaning are readily discerned by the eye. Only as individuals rely on a minimum number of cues to recognize words that look alike

such as "that", "them", "this", "then", "these", "their", and "there" can they develop into fast, efficient readers who are free to concentrate on thinking about meaning. Finally, visualization is the skill necessary to remember words from one day to the next. Visualization is ultimately what reading, spelling, and writing are all about. The child who remembers word forms from day to day is the one who is learning to read. No word analysis type skills can take the place of the ability to visualize words. Analysis skills are merely supportive to visualization ability. Individuals who have visualization ability are usually those who are good spellers because they can visualize and remember the exact order of letters in a word. Likewise, handwriting depends upon visualization since it requires the ability to visualize and remember the directionality of letter forms and the configuration of letters and words. An alphabet test has proved to be a good predictor of success in reading in the first grade for the probable reason that it identifies those children who mentally visualize auditory and visual forms of letters. This ability carries over into visualizing and learning whole words. A child who has adequate intelligence but has visualization difficulties will soon become a problem reader and likely be classified as being learning disabled.

Word learning tests designed to determine the mode of instruction best suited to a child's word remembering ability should become an important subtest of diagnostic reading tests. The Mills Learning Methods Test is an example of such a test. Enough research has not been forthcoming in this aspect of diagnosis presumably because of the complications that are involved in their administration. These tests would of necessity be administered over a period of time and then readministered over a similar period of time to measure delayed learning. This feature makes them impractical in many clinical situations.

Like auditory skills, screening tests for visual efficiency and discrimination are relatively easy to administer and score. School workbooks and supplementary games are usually not at a loss for suggesting visual discrimination exercises. Visual integration and memory tests are not as readily administered and scored and therefore are not used to as great an extent on school screening tests. In a clinical situation, these higher level visual skills must be tested to make intelligent educational recommendations. Figure III provides a representative list of tests which may aid in the diagnosis of the various visual abilities.

Since sensory experience forms the foundation for perception and cognition, an appraisal of sensory efficiency and abilities must be included in a thorough diagnosis of a child. The taxonomy and clinical protocol referred to in Figures I and II have been devised as means of organizing for diagnosis and remediation in an educational reading and/or learning disorder clinic. Hopefully, the taxonomy will remove some of the perplexity from the diagnostic procedure and clarify teaching tasks for teachers.

Figure 1

A Taxonomy of Sensory Skills Used in Perception and Cognition

1. VISUAL
   a. Efficiency
   b. Discrimination
   c. Integration
   d. Memory

2. AUDITORY
   a. Efficiency
   b. Discrimination
   c. Integration
   d. Memory

3. TACTILE-KINESTHETIC
   a. Reflexes
   b. General Motor
   c. Special Motor Systems
   d. Speech Motor

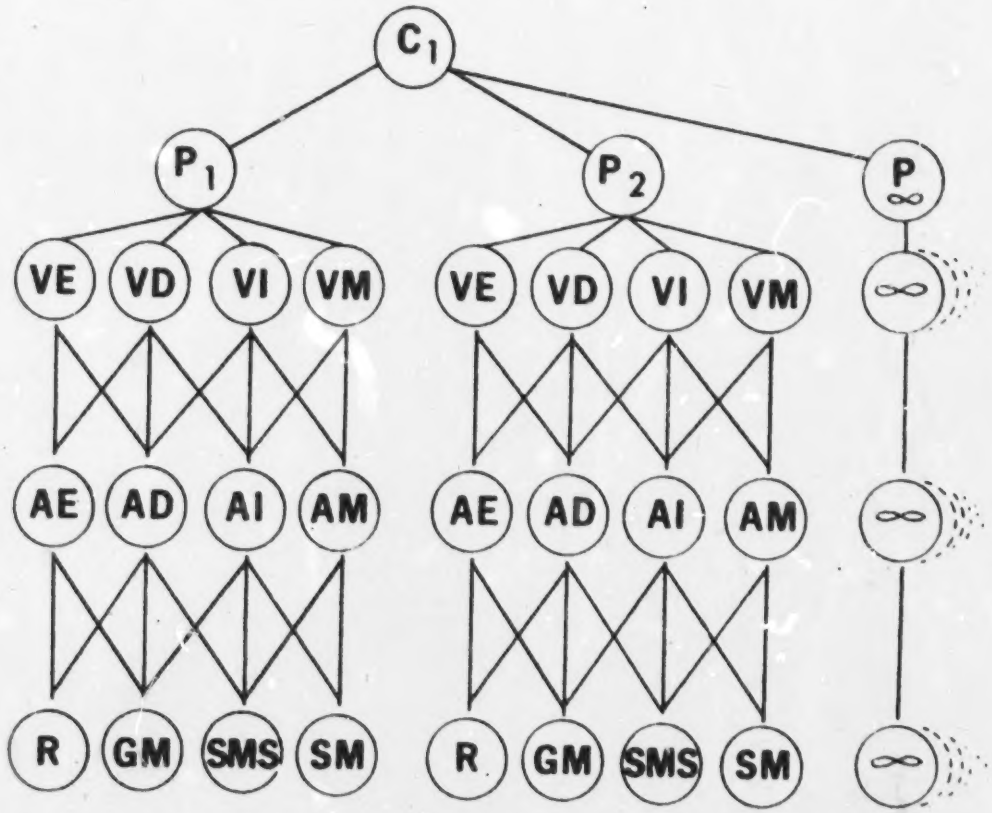

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Figure 2

Clinical Protocol

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Name of Client _____

Clinician in Charge _____

Staff Clinicians _____

I. Tactile–Kinesthetic Tests

A. General Motor	Staff	Time
_____	_____	_____
_____	_____	_____
_____	_____	_____
B. Special Motor Systems		
_____	_____	_____
_____	_____	_____
_____	_____	_____
C. Speech Motor Systems		
_____	_____	_____
_____	_____	_____

II. Auditory Tests

A. Efficiency		
_____	_____	_____
B. Discrimination		
_____	_____	_____
_____	_____	_____
C. Integration		
_____	_____	_____
_____	_____	_____
D. Memory		
_____	_____	_____
_____	_____	_____

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III. Vision Tests

	Staff	Time
A. Efficiency		
B. Discrimination		
C. Integration		
D. Memory		

IV. Perceptual and Cognitive Efficiency Tests

A. Sight Vocabulary Tests		
B. Word Analysis Tests		
C. Reading Tests		
D. Informal Reading Inventory		

V. Personality and Interest Tests and Inventories

A. Parent Interview		
B. Child Interview		
C. Personality Test		

Figure 3

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A. Sensory Skills: Tactile Kinesthetic

1. General motor and special motor skills

a. Devereux Test of Extremity Coordination: The Devereux Schools in Pennsylvania, 19 South Waterloo Road, Devon, Pa. 19333
b. McGahan and McGahan, Early Detection Inventory: Follett Education Corporation, 1010 West Washington Blvd., Chicago, Ill. 60607
c. McCarthy Scale of Children's Ability: Psychological Corporation, 304 East 45th Street, New York 10017
d. The Primary Visual Motor Test: Grune and Stratton, 381 Park Avenue South, New York 10016
e. First Grade Screening Test: American Guidance Service, Publishers' Building, Circle Pines, Minn. 55014
f. Beery-Buktenica Developmental Test of Visual-Motor Integration: Follett Publishing Company, 1010 West Washington Boulevard, Chicago, Ill.
g. Perceptual Forms Test: Winter Haven Lions Publication, P. O. Box 1045, Winter Haven, Florida 33880
h. Harris Tests of Lateral Dominance: Psychological Corporation, 304 East 45th Street, New York

B. Sensory Skills: Auditory

1. Auditory Efficiency

a. Maico Audiometer; Minneapolis, Minn.
b. Most any approved audiometer
c. Informal observation

2. Auditory Discrimination

a. Wepman Auditory Discrimination Test: Joseph Wepman, 950 E. 59th Street, Chicago, Ill.
b. Clymer-Barrett Prereading Battery: Ginn and Company, 2550 Hanover Street, Palo Alto, Calif. 94304
c. Gates-MacGinitie Reading Tests - Readiness: Teacher College Press, Columbia University, New York 10027
d. Harris-Stroud Reading Readiness Profiles: Houghton-Mifflin Co., 53 West Third Street, New York 10036
e. Steinback Test of Reading Readiness: Scholastic Test Services, Inc. 480 Meyer Road, Bensenville, Ill. 60106
f. Auditory Discrimination Shack Test, Auditory Discrimination
g. Jack Katz's Kindergarten Auditory Screening Test, Same/Different Subjects: Follett Publishing Company, 1040 West Washington Boulevard, Chicago, Ill. 60607
h. Goldman, Fristoe, and Woodcock, Test of Auditory Discrimination: American Guidance Service, Publishers Building, Circle Pines, Minn. 55014

3. Auditory Integration

a. Auditory Discrimination Shack Test, Auditory Blending

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b. Murphy-Durrell Reading Readiness Analysis, Phonemes Test: Harcourt Brace, Jovanovich, 757 Third Avenue, New York
c. Illinois Test of Psycholinguistic Ability, Sound blending: University of Illinois Press, Urbana, Ill. 61803
d. Jack Katz's Kindergarten Auditory Screening Test, Speech in Noise Subtest and Phonemic Synthesis Subtest: Follett Publishing Company, 1010 West Washington Boulevard, Chicago, Ill. 60607
e. Stanford Diagnostic Reading Test, Sound Blending: Harcourt, Brace, Jovanovich, 757 Third Avenue, New York 10017
f. Monroe and Sherman Group Diagnostic Reading Aptitude and Achievement Test: C. H. Nevins Printing Co., 311 Bryn Mawr Island, Brandenton, Florida 33505

4. Auditory Memory

a. Jack Katz's Kindergarten Auditory Screening Test, Phonemic Synthesis Subtest: Follett Publishing Company, 1010 West Washington Boulevard, Chicago, Ill. 60607
b. Cooperative Primary Test: Educational Test Service, Rosedale Road, Princeton, N.J. 08540
c. Durrell Analysis of Reading Difficulty, Listening: Houghton-Mifflin Co., 53 W. Third Street, New York 10036
d. Gates-MacGinitie Readiness Tests - Readiness, Following Directions and Listening Comprehension: Teacher College Press, Columbia University, New York 10027
e. Informal Reading Inventories - Listening Comprehension
f. Auditory Discrimination Shack Test, Auditory Memory
g. Monroe-Sherman, Group Diagnostic Reading Aptitude and Achievement Tests: Ch. H. Nevins Printing Co., 311 Bryn Mawr Island, Brandenton, Florida 33505

C. Sensory Skills: Visual

1. Visual Efficiency

a. Telebinocular: Keystone View Company, Meadville, Pa.
b. A-O School Vision Screening Test: American Optical Co., Southbridge, Mass.
c. Informal observation

2. Visual Discrimination

a. Primary Mental Ability, Perceptual Speed: Science Research Associates, Chicago, Ill.
b. Metropolitan Readiness Tests, Matching: Harcourt, Brace, Jovanovich, New York

3. Visual Integration

a. Illinois Test of Psycholinguistic Abilities, Visual Motor Association Section: University of Illinois Press, Urbana, Ill.
b. Metropolitan Readiness Tests, Copying: Harcourt, Brace, Jovanovich, New York
c. Wechsler Intelligence Scale For Children, Mazes: Psychological Corporation, New York

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d. Beery-Buktenica Developmental Test of Visual Motor Integration: Follett Educational Corporation, Chicago, Ill.
e. Perceptual Forms Test: Winter Haven Lions Publication, P. O. Box 1045, Winter Haven, Florida 33880
f. Marianne Frostig Developmental Test of Visual Perception, Consulting Psycholgists Press, 577 College Ave., Palo Alto, California

4. Visual Memory

a. Illinois Test of Psycholinguistic Abilities, Visual-Sequential Memory: University of Illinois Press, Urbana, Ill.
b. Wechsler Intelligence Scale for Children, Sentences and Coding: Psychological Corporation, New York
c. Murphy Durrell Reading Readiness Analysis: Harcourt, Brace, Jovanovich, New York
d. Steinback Test of Reading Readiness, Memory for Word Forms: Scholastic Test Services, Inc., 480 Meyer Road, Bensenville, Ill. 60106
e. Learning Method Test: Mills Center, Inc., 1512 E. Broward Blvd., Ft. Lauderdale, Florida

Materials designed to improve sensory skill

1. Motor skills Development Laboratory: Educational Progress Laboratory, 8538 East 41st Street, Tulsa, Oklahoma 74145

Gross motor hand-eye coordination and fine motor skills.

2. Individual Motor Achievement through Guided Education: Devereux Schools in Pennsylvania, 19 South Waterloo Road, Devon, Pa. 19333

For emotionally handicapped and neurologically impaired children from 4 to 10 years of age. Development of sequential motor ability, fine motor ability, static balance, and perceptual motor activity.

3. Developing Prereading Skills by Rachel Brake: Holt, Rinehart, & Winston, 383 Madison Avenue, New York 10017

Visual memory, auditory memory, visual and auditory discrimination, gross and fine motor coordination, kinesthetic mode, and tactile discrimination.

4. Developing Learning Readiness: McGraw-Hill, Webster Division, Princeton Road, Hightstown, N.J. 08520

Visual memory, hand-eye coordination, and gross and fine motor coordination.

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5. Sound, Order, Sense: Follett Publishing Company, 1010 West Washington Blvd., Chicago, Ill. 60607

   Auditory perception skills. Auditory sequence, discrimination, awareness, meaning, focus, and memory.

6. Intersensory Reading Program by Cecelia Pollack: Book-Lab, Inc., 1449 Thirty-Seventh Street, Brooklyn, New York 11218

   Visual, auditory, and kinesthetic integration and memory utilized and developed to teacher decoding skills in reading. Particularly good to develop childrens ability to blend sounds into words.

7. Listen, Mark, & Say: Appleton-Century-Crofts, 4140 Park Avenue South, New York 10016

   It attempts to teach specific auditory skills which aid the development of auditory discrimination, auditory integration, and auditory memory.

8. The Remediation of Learning Disabilities by Robert Valett: Fearon Publishers, 6 Davis Drive, Belmont, California 94002

   Specific list of games and exercises to develop gross motor skills; auditory association and memory, visual association and memory; and visual-motor association and memory.

9. Activities For Developing Psycholinguistic Skills With Preschool Culturally Disadvantaged Children: Institute for Research on Exceptional Children, University of Illinois, Urbana, Illinois 61801

   Specific suggestions for developing visual, auditory, and motor skills in discrimination, integration, and memory.

10. Try: Noble and Noble, 750 Third Avenue, New York 10017

    It attempts to develop visual skills in areas of discrimination, integration, and memory.

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